Response
The RISKIND code has been used widely and is generally accepted as appropriate for estimating the consequences of transportation accidents that could release radioactive materials. RADTRAN 5 was used for the analyses in the Final EIS.

8 (12273)
Comment - EIS010096 / 0017
Figure 2-4 of the SUPPLEMENT TO THE DRAFT EIS refers only to direct rail access and heavy-haul access to the site. The text on Page 2-12 refers to legal-weight trucks. It is not clear if DOE anticipates legal-weight trucks being used to transport waste directly to the Yucca Mountain site.

Response
Even though DOE has expressed a preference for rail, both nationally and in Nevada, the repository design would facilitate the ability to receive spent nuclear fuel or high-level radioactive waste delivered by legal-weight truck.

8 (12415)
Comment - EIS010279 / 0004
Although transportation issues were not discussed in the Supplement to the Draft EIS, the DOE recently informed the Timbisha Shoshone Tribe that the proposed *Carlin/Caliente Bonnie Claire Option* for a rail corridor to Yucca Mountain goes right through the Scottys Junction Trust Parcel of the Tribe (see attached map). Let it be on record that the Timbisha Shoshone Tribe strongly opposes this proposed rail corridor because of its potential threat to the land, the safety of tribal members, and the adverse effects it would have on the Tribe's economic development. The inadequate, small scale map in the DEIS (p. 6-42) did not show this occurrence even though *The Timbisha Shoshone Tribal Homeland: A Draft Secretarial Report to Congress to Establish a Permanent Tribal Land Base and Related Cooperative Activities* indicated the location of the proposed Trust land parcel (p. 35) and was published in April 1999, three months before the publication of the DEIS for Yucca Mountain.

Response
The Department acknowledges the Timbisha Shoshone Tribe's opposition to the Bonnie Claire option of the Carlin and Caliente Corridors. At this time, DOE has not identified a preference for a specific rail corridor within Nevada. DOE would identify a preferred corridor only if the Yucca Mountain site were approved under the NWPA, and then only after consultation with affected stakeholders, particularly the Timbisha Shoshone Tribe.

Section J.3.1.3 of the EIS contains a discussion of the land-use conflicts with each of the evaluated rail corridors, including the Bonnie Clare Alternate. Detailed corridor maps included in this section show the Timbisha Shoshone Trust Lands and the proposed alignment.

8.1 General Opposition to Transporting Spent Nuclear Fuel and High-Level Radioactive Waste

8.1 (170)
Comment - 589 comments summarized
Commenters stated their opposition to the transportation of spent nuclear fuel and high-level radioactive waste to Yucca Mountain by rail, heavy-haul truck, or legal-weight truck. In many cases, reasons for the opposition were not specified or were very broad in scope. Examples include broad, nonspecific impacts to the environment and ecosystem; generic accidents with catastrophic consequences; incidental and cumulative radiation exposure to millions of people along the transport routes during decades of transport; sabotage and terrorist attacks; and natural disasters.

Many commenters expressed opposition to spent nuclear fuel and high-level radioactive waste transport through specific neighborhoods, cities, heavily populated areas, specific states, and other areas. Reasons for the opposition included the proximity of potential routes to specific structures and areas such as private residences, schools, hospitals, lakes, rivers, and Native American tribal lands. Some commenters stated that the EIS does not provide adequate detail regarding transportation risks along designated nationwide routes and specific cities and communities. Others were opposed because of the disproportionate share of shipments that would travel through a

particular neighborhood, city, or state. Still others were opposed because they believe their quality of life would be adversely affected due to the large number of shipments over many years.

Commenters were also opposed to spent nuclear fuel and high-level radioactive waste transport because of site-specific concerns about emergency preparedness training, cleanup costs after an accident, and predicted damages to property values if an accident occurred.

Response

Based on the results of the impact analyses presented in Chapter 6 and Appendix J of the EIS, as well as the results published in numerous other studies and environmental impact analyses cited in the EIS, DOE is confident that spent nuclear fuel and high-level radioactive waste could be and would be safely transported to Yucca Mountain. DOE believes, as the EIS reports, that the potential impacts of this transportation would be so low for individuals who lived and worked along the routes that these individual impacts would not be discernible even if the corresponding doses could be measured. The analysis presented in the EIS factored in the characteristics of spent nuclear fuel and high-level radioactive waste, the integrity of shipping casks that would be used for transportation, and the regulatory and programmatic controls that would be imposed on shipping operations (see Appendix M). The EIS analytical results are supported by numerous technical and scientific studies that have been compiled through decades of research and development by DOE and other Federal agencies of the United States, including the Nuclear Regulatory Commission and the U.S. Department of Transportation, as well as by the international community, including the International Atomic Energy Agency.

DOE believes that the EIS adequately analyzes the environmental impacts that could result from the Proposed Action. DOE also believes that the EIS provides the information necessary to make decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (either rail or truck shipments), as well as the choice among alternative rail corridors in Nevada, if the site was recommended and approved. See the introduction to Chapter 8 of this Comment-Response Document for more information.

DOE does not believe it necessary to consider population characteristics on a community-by-community basis to determine potential public health and safety impacts from the transportation of spent nuclear fuel and high-level radioactive waste. The use of widely accepted analytical tools, latest reasonably available information, and cautious but reasonable assumptions if there are uncertainties offer the most appropriate means to arrive at conservative estimates of transportation-related impacts.

In this EIS, DOE has used computer models it has used in previous EISs and other studies. These models are widely accepted by the national and international scientific and regulatory communities. For instance, DOE selected the RADTRAN 5 computer program to estimate radiological impacts to populations from incident-free transportation and from accidents. RADTRAN, which was originally developed by Sandia National Laboratories in the late 1970s, has been used in many other DOE EISs, and it has undergone periodic review and revision. In 1995, a review of RADTRAN 4 (immediate predecessor of RADTRAN 5) demonstrated that it yielded acceptable results when compared to "hand" calculations. More recently, a review found that RADTRAN 5 overestimates the measured radiation dose to an individual from moving radiation sources.

To ensure that the EIS analyses reflect the latest reasonably available information, DOE has either incorporated information that has become available since the publication of the Draft EIS or modified existing information to accommodate conditions likely to be encountered over the life of the Proposed Action. For example, the analysis in the Draft EIS relied on population information from the 1990 Census. In this Final EIS, DOE has scaled impacts upward to reflect the relative state-by-state population growth to 2035, using 2000 Census data.

Transportation by legal-weight truck would involve shipments along Interstate System highways, beltways, and bypasses, where available, in accordance with U.S. Department of Transportation regulations (49 CFR 397.101). These regulations allow states and tribes to designate alternate routes in accordance with U.S. Department of Transportation guidelines (49 CFR 397.103). Thus, states and tribes would have the opportunity to designate eligible routes that they prefer to be used.

There are no Federal regulations pertaining to rail routes for shipment of spent nuclear fuel or high-level radioactive waste. The shipper and railroad companies (carriers) determine rail routes based on best available trackage,

schedule efficiency, and cost-effectiveness. This includes selecting routes that result in minimum time in transit, minimum interchanges, and maximum use of mainline tracks. The routes must be submitted in advance to the Nuclear Regulatory Commission for approval. In addition, DOE has developed operational protocols (see Section M.3 of the EIS) that include guidelines for selecting rail routes. DOE applied the guidelines in identifying routes for analysis in the EIS.

Section 6.2.4 of the EIS provides results of analyses from postulated transportation accidents and Section J.1.4 provides details of the methods and data used in the analyses. The analysis of impacts to populations along shipment routes assumed that an accident could occur at any location along the route. Given the number of shipments, traffic accidents probably would occur, although DOE does not believe that any of the accidents would be severe enough to result in the release of radioactive material, primarily because of the structural integrity of the casks in which the material would be transported.

"Real-life" transportation accidents involve a myriad of collisions, such as with other vehicles and obstacles, that could result in fires and explosions, inundation or burial of a cask containing spent nuclear fuel and high-level radioactive waste. These accidents would be initiated by a variety of events including human error, mechanical failure, or natural causes, such as earthquakes or landslides. Accidents could occur in different places such as mountain passes, urban areas, on Interstate Highways in rural areas, or rail switchyards.

The combinations of accident conditions, initiating events, and locations is very large. Analyzing an extensive array of accident scenarios is neither practical nor meaningful. However, it is meaningful to analyze a range of reasonably foreseeable accident scenarios that consider, in effect, common initiating events and conditions having similar characteristics. Thus, for example, the EIS analyzes the impacts of various collision accidents in which a cask would be exposed to a range of impact velocities (see Section J.1.4.2.1).

The EIS also analyzes a maximum reasonably foreseeable accident, an accident with a probability of occurrence of about 3 in 10 million per year. To put this in perspective, this accident would occur once in the course of about 5 billion legal-weight truck shipments. In this scenario, a truck cask, not involved in a collision, would be engulfed in a fire with temperatures between 750°C and 1,000°C (1,400°F to 1,800°F) (see Section 6.2.4.2 of the EIS). The conditions of the maximum reasonably foreseeable accident analyzed in the EIS envelop conditions reported for the Baltimore Tunnel fire (a train derailment and fire that occurred in July 2001 in a tunnel in Baltimore, Maryland). Temperatures in that fire were reported to be as high as 820°C (1,500°F), and the fire was reported to have burned for up to 5 days.

DOE could decide to use a dedicated train that carried only the material to be shipped to Yucca Mountain, or could elect to move the spent nuclear fuel and high-level radioactive waste by general freight. If the material was shipped as general freight, the position of the spent nuclear fuel or high-level radioactive waste car in the train would be regulated by 49 CFR 174.85. This regulation requires that railcars placarded "radioactive" must be separated from a locomotive, occupied caboose, or carload of undeveloped film by at least one nonplacarded car, and it may not be placed next to other placarded railcars of other hazard classes.

Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000, all). DOE has concluded that the models used for analysis in the Draft EIS relied on assumptions about spent nuclear fuel and cask response to accident conditions that caused an overestimation of the resulting impacts. Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents. (Of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials.) This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS reports the potential consequences for accidents that could release radioactive materials.

The Nuclear Regulatory Commission has developed a set of rules specifically aimed at protecting the public from harm that could result from sabotage of spent nuclear fuel casks. Known as physical protection and safeguards regulations (10 CFR 73.37), these security rules are distinguished from other regulations that deal with issues of

safety affecting the environment and public health. The objectives of the physical protection and safeguards regulation are to minimize the possibility of sabotage and facilitate recovery of spent nuclear fuel shipments that could come under control of unauthorized persons. The cask safety features that provide containment, shielding, and thermal protection also provide protection against sabotage. The casks would be massive. The spent nuclear fuel in a cask would typically be only about 10 percent of the gross weight; the remaining 90 percent would be shielding and structure.

It is not possible to predict whether sabotage events would occur, and if they did the nature of such events, nevertheless, DOE examined various accidents, including an aircraft crash into a transportation cask. The consequences of both the maximum reasonably foreseeable accident and the aircraft crash are presented in the EIS for the mostly truck and mostly rail transportation scenarios and can provide an approximation of the types of consequences that could occur from a sabotage event. In addition, DOE analyzed the potential consequences of sabotage against a truck or rail cask (see Section 6.2.4.2.3 of the EIS). The results of this analysis indicate that the risk of the maximally exposed individual incurring a fatal cancer would increase from approximately 23 percent (the current risk of incurring a fatal cancer from all other causes) to about 29 percent. The same event could cause 48 latent cancer fatalities in an assumed population of a large urban area.

Because of the terrorist attack of September 11, 2001, the Department and other agencies are reexamining the protections built into their physical security and safeguards systems for transportation shipments. As dictated by results of this reexamination, DOE would modify its methods and systems as appropriate.

Section 180(c) of the NWPA requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions the Department would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for addressing emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using a planning grant and based on availability of funds in annual Program budgets specified by Congress. Additional Federal response capabilities, such as expert services from the Radiological Assistance Program Team, could be activated, as requested by states and tribes. The schedule in the proposed policy and procedures (63 *FR* 23753; April 30, 1998) for implementation of Section 180(c) of the NWPA is designed to provide adequate time for training of first responders in advance of the first shipments. If there was a decision to proceed with the development of a repository at Yucca Mountain, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) Policy and Procedures.

The Price-Anderson Act establishes a system of financial protection (compensation for personal injury and property damage, including loss of use of property) for the public in a nuclear accident, regardless of who causes the damage. The Price-Anderson Act would indemnify any person held liable for damage, including cleanup of released radioactive materials. Persons indemnified would include DOE contractors, subcontractors, suppliers, state, local or tribal governments, emergency response workers, health care workers, other workers, victims, and other citizens who might be held liable. See Section M.8 of the EIS for a discussion of the Price-Anderson Act.

In light of the comments received on the Draft EIS concerning perceived risk, DOE examined relevant studies and literature on perceived risk and stigmatization of communities to determine whether the state-of-the-science in predicting future behavior based on perceptions had advanced sufficiently since the scoping process for this EIS to enable DOE to quantify the impact of public risk perception on economic development or property values in potentially affected communities (see Section 2.5.4 and Appendix N of the EIS). Of particular interest were scientific and social studies performed in the past few years that relate directly either to Yucca Mountain or to DOE actions such as the transportation of foreign research reactor spent nuclear fuel. DOE reevaluated the conclusions of previous literature reviews such as those conducted by the Nuclear Waste Technical Review Board and the State of Nevada, among others. DOE has concluded that:

- While in some instances risk perceptions could result in adverse impacts on portions of a local economy, there are no reliable methods whereby such impacts could be predicted with any degree of certainty.

- Much of the uncertainty is irreducible.

- Based on a qualitative analysis, adverse impacts from perceptions of risk would be unlikely or relatively small.

While stigmatization of southern Nevada can be envisioned under some scenarios, it is not inevitable or numerically predictable. Any such stigmatization would likely be an aftereffect of unpredictable future events, such as serious accidents, would not expect such accidents to occur. As a consequence, DOE addressed but did not attempt to quantify any potential for impacts from risk perceptions or stigma in the Final EIS.

8.1 (259)
Comment - 125 comments summarized
Many commenters expressed general opposition to the transportation of spent nuclear fuel and high-level radioactive waste through Nevada. A summary of the comments is as follows:

- Many were opposed to transportation near certain types of structures or areas, including schools, hospitals, businesses, lakes, rivers, and Native American tribal reservations.

- Some commenters were more specific, stating that the EIS does not provide adequate detail about the risks and impacts of spent nuclear fuel and high-level radioactive waste transport to specific towns and cities in Nevada and of impacts to areas through which the largest number of shipments would pass. Specific areas and issues mentioned by commenters include:

  - The Las Vegas Valley, including impacts on tourism
  - Impacts to communities near Yucca Mountain
  - The effects on property values along transportation routes
  - Impacts of using specific routes such as State Route 160 in Pahrump Valley
  - Impacts to specific communities such as the town of Enterprise;
  - Impacts to land use and access across a branch rail line

Impacts of heavy-haul truck shipments from Caliente and the feasibility of using U.S. 95 because of steep grades, curves with a radius of less than 240 meters (800 feet), and critical side slopes and steep dropoffs that would increase the probability of accidents and complicate subsequent clean up

- Some commenters were opposed to the Caliente and Caliente-Chalk Mountain Corridors through Garden Valley, stating that the use of existing roads would be less wasteful and better from an environmental standpoint.

- The hot springs near the northern end of the Carlin Corridor, as well as the seasonal playa lakes in the area, were cited as reasons not to select the Carlin Corridor. Other commenters, however, said that the Carlin Corridor would be the best because it would avoid many towns and cities in Nevada.

Some questioned the overall suitability of roads and highways in Nevada to transport spent nuclear fuel and high-level radioactive waste, including the potential for transportation accidents. Many commenters had specific concerns about the use of the Las Vegas Beltway for truck shipments to Yucca Mountain. These concerns included:

- The possibility that the Beltway would not meet Interstate Highway System standards until 2023, which is many years after shipments would begin and the use of the U.S. Highway 95/I-15 interchange (the “Spaghetti Bowl”) while the Beltway is being completed

- The costs of accelerated construction of the Beltway;

- The future population that would be exposed to spent nuclear fuel and high-level radioactive waste shipments along and near the Beltway, including expected heavily populated residential and commercial areas along the beltway in the City of North Las Vegas and in the Summerlin area on the west side of Las Vegas, and the use of projected traffic volumes on the Beltway in the future.

- Figure S-12 incorrectly shows secondary roads not extending to the vicinity of the Las Vegas Beltway when these roads already extend well beyond the beltway.

Others commenters were concerned about terrorist attacks, sabotage, and security issues; inexperienced drivers; evacuation measures; emergency response; radiation exposure; compensation for injuries; advance notice of shipments; local control of routing and time-of-day restrictions; bad weather; and the presence of Native American tribal populations along the routes.

Response

Based on the results of the impact analyses presented in Chapter 6 and Appendix J of the EIS, as well as the results published in numerous other studies and environmental impact analyses cited in the EIS, DOE is confident spent nuclear fuel and high-level radioactive waste can be and would be safely transported to Yucca Mountain. DOE believes, as the EIS reports, that the potential impacts of this transportation would be so low for individuals who live and work along the routes that these individual impacts would not be discernible even if the corresponding doses could be measured. The analysis presented in the EIS factored in the characteristics of spent nuclear fuel and high-level radioactive waste, the integrity of shipping casks that would be used for transportation, and the regulatory and programmatic controls that would be imposed on shipping operations (see Appendix M). The EIS analytical results are supported by numerous technical and scientific studies that have been compiled through decades of research and development by DOE and other Federal agencies, including the Nuclear Regulatory Commission and the U.S. Department of Transportation, as well as by the international community, including the International Atomic Energy Agency.

DOE believes that the EIS adequately analyzes the environmental impacts that could result from the Proposed Action. DOE also believes that the EIS provides the information necessary to make decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (either rail or truck shipments), as well as the choice among alternative rail corridors in Nevada, if the site was recommended and approved. See the introduction to Chapter 8 of this Comment-Response Document for more information.

DOE does not believe it necessary to consider population characteristics on a community-by-community basis to determine potential public health and safety impacts from the transportation of spent nuclear fuel and high-level radioactive waste. The use of widely accepted analytical tools, latest reasonably available information, and cautious but reasonable assumptions if there are uncertainties offer the most appropriate means to arrive at conservative estimates of transportation-related impacts.

In this EIS, DOE has used computer models it has used in previous EISs and other studies. These models are widely accepted by the national and international scientific and regulatory communities. For instance, DOE selected the RADTRAN 5 computer program to estimate radiological impacts to populations from incident-free transportation and from accidents. RADTRAN, which was originally developed by Sandia National Laboratories in the late 1970s, has been used in many DOE EISs, and it has undergone periodic review and revision. In 1995, an independent review of RADTRAN 4 (immediate predecessor to RADTRAN 5) demonstrated that it yielded acceptable results when compared to "hand" calculations. More recently, an independent review found that RADTRAN 5 overestimates the measured radiation dose to an individual from moving radiation sources.

To ensure that the EIS analyses reflect the latest reasonably available information, DOE has either incorporated information that has become available since the publication of the Draft EIS or modified existing information to accommodate conditions likely to be encountered over the life of the Proposed Action. For example, the analysis in the Draft EIS relied on population information from the 1990 Census. In this Final EIS, DOE has scaled impacts upward to reflect the relative state-by-state population growth to 2035, using 2000 Census data.

Spent nuclear fuel and high-level radioactive waste can be harmful to human health and the environment because they emit radiation as the elements in them decay. For this reason, Nuclear Regulatory Commission and U.S. Department of Transportation regulations, as well as DOE's own internal Orders, specify containment, shielding, thermal, and nuclear safety requirements for shipping containers (casks). These regulations are designed to preclude even a remote chance of direct exposure. In addition, spent nuclear fuel and high-level radioactive waste are not easily dispersed; they do not readily dissolve in water; they are not liquids or gases that can be easily spilled or leaked, and radiation from them does not make other materials radioactive. Spent nuclear fuel and high-level

radioactive waste are solids. They are hard, tough, and dense ceramics, metals, or glasses contained within tough metal barriers.

The shipping casks used to transport these materials are massive, with design features that comply with strict regulatory requirements to ensure that the casks are fault-tolerant. That is, the casks must perform their safety functions even when damaged. Numerous tests and extensive analyses, using the most advanced analytical methods available, have demonstrated that these types of shipping casks would provide containment and shielding even under the most severe kinds of accidents. Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000, all). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents. (Of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials.) This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS reports potential consequences for accidents that could release radioactive materials.

Although the risk of releasing radioactive materials from a shipping cask in an accident would be small, the U.S. Department of Transportation requires highway shipments to use preferred routes that reduce time in transit (49 CFR 397.101). The Department of Transportation regulations provide for states and tribes to designate alternate preferred routes. These regulations require a state or tribe to consider overall public safety in designating routes that would be in lieu of or in addition to routes specified by the Department of Transportation regulations. For example, under current Federal regulations, before DOE highway shipments of spent nuclear fuel and high-level radioactive waste could use U.S. 95 through Mineral County, Nevada, the State would need to designate this route as an alternate route. The Department of Transportation requirements and the planned completion of the Las Vegas Beltway led DOE to assume, for purposes of analysis in the EIS, that legal-weight truck shipments would not enter the Spaghetti Bowl interchange of Interstate-15 and U.S. 95. Nevertheless, to assess how potential impacts would be different from those of using the Las Vegas Beltway, DOE analyzed the impacts for legal-weight trucks to travel through the Spaghetti Bowl interchange (see Section J.3.1.3 of the EIS for an analysis of the impacts of using different routes in Nevada). DOE did not analyze transportation by heavy-haul trucks through the Spaghetti Bowl interchange because use of the interchange would not be practical. The high volume of traffic through the interchange combined with the slow progression of the trucks through the turns and the over-length configurations of the vehicles would create excessive disruptions of traffic flow.

DOE revised maps in the EIS to represent streets and roads correctly in the Las Vegas Valley and illustrate that many extend to and beyond the Las Vegas Beltway.

The U.S. Department of Transportation routing requirements, along with regulatory requirements to limit radiation dose external to a shipping cask, would help to ensure that radiation doses to persons residing along the routes would be low. The analysis in Chapter 6 of the EIS for the mostly legal-weight truck scenario estimates the dose to persons who would drive alongside the trucks as they traveled on the highways, who would be stopped in locales where truck shipments stopped, and who lived along the routes that would be used. In response to public comments, DOE forecasted growth in populations along routes to estimate potential impacts that could occur in the future when shipments would occur. However, the estimated dose to an individual living along a route would not change with changes in population—only the integrated dose to the whole population would change. The dose for a maximally exposed individual who lived along a route would be an average of about .25 millirem per year. This is about 400 times less than the maximum dose permitted for members of the public in 10 CFR Part 20 (100 millirem).

Based on public comments, the Final EIS includes estimated public health along transportation routes. This analysis accounted for factors such as the locations of intersections, commercial establishments and residences, and traffic signals. The impacts of incident-free transportation would be so low for individuals who lived and worked along the routes that these individual impacts would not be discernible even if the doses could be measured. The total impacts of transportation would be similar for different routes that might be used.

To calculate the potential impacts to a maximally exposed individual, DOE used information and assumptions from a report sponsored by the City of North Las Vegas, Nevada, because DOE believes it to be the only source of the

information (DIRS 155112-Berger Group 2000). However, DOE considers the exposure assumptions presented in the report to be extreme and very unlikely to occur (see text box in Section 6.2.1 of the EIS for additional information). The DOE analysis of dose, using information and assumptions presented in the report, estimated a maximally exposed individual in Nevada would receive a dose of about 530 millirem over 24 years. This is an annual dose of about 22 millirem, which is about 6 percent of a 1-year exposure to natural background radiation, and 22 percent of the limit for members of the public listed in Nuclear Regulatory Commission regulations (10 CFR Part 20). A dose of 530 millirem would increase an individual's risk of a fatal cancer by about 1 chance in 4,000 over the person's lifetime. For perspective, an individual's lifetime risk of a fatal cancer from all other causes is about 1 in 4. So, even using the unlikely exposure assumptions contained in the Berger Group report shows that the dose to a maximally exposed individual would be well below that received from natural background radiation, would not be discernible, and would not add measurably to other impacts that an individual could incur.

Nuclear Regulatory Commission and U.S. Department of Transportation regulations (10 CFR Part 73 and 49 CFR Part 173, respectively) include requirements to ensure the physical security and protection of shipments from diversion and attack. For the Final EIS, DOE reexamined, for both rail and truck casks, the consequences of an attack that results in a release of material (in other words, the cask's shield wall would be penetrated) (see Section 6.2.4.2.3 of the EIS), and estimated consequences exceeded those presented in the Draft EIS. Differences in the consequences between the Draft EIS and the Final EIS are due to using "representative" spent nuclear fuel (rather than "typical" fuel in the Draft EIS) and an escalation of impacts to represent population growth to 2035. In addition, in the Draft EIS the consequences of the sabotage event were bounded by those of the maximum reasonably foreseeable accident.

The Nuclear Regulatory Commission has developed a set of rules specifically aimed at protecting the public from harm that could result from sabotage of spent nuclear fuel casks. Known as physical protection and safeguards regulations (10 CFR 73.37), these security rules are distinguished from other regulations that deal with issues of safety affecting the environment and public health. The objectives of the physical protection and safeguards regulation are to minimize the possibility of sabotage and facilitate recovery of spent nuclear fuel shipments that could come under control of unauthorized persons. The cask safety features that provide containment, shielding, and thermal protection also provide protection against sabotage. The casks would be massive. The spent nuclear fuel in a cask would typically be only about 10 percent of the gross weight; the remaining 90 percent would be shielding and structure.

It is not possible to predict whether sabotage events would occur, and if they did the nature of such events, nevertheless, DOE examined various accidents, including an aircraft crash into a transportation cask. The consequences of both the maximum reasonably foreseeable accident and the aircraft crash are presented in the EIS for the mostly truck and mostly rail transportation scenarios and can provide an approximation of the types of consequences that could occur from a sabotage event. In addition, DOE analyzed the potential consequences of sabotage against a truck or rail cask (see Section 6.2.4.2.3 of the EIS). The results of this analysis indicate that the risk of the maximally exposed individual incurring a fatal cancer would increase from approximately 23 percent (the current risk of incurring a fatal cancer from all other causes) to about 29 percent. The same event could cause 48 latent cancer fatalities in an assumed population of a large urban area.

Because of the terrorist attack of September 11, 2001, the Department and other agencies are reexamining the protections built into their physical security and safeguards systems for transportation shipments. As dictated by results of this reexamination, DOE would modify its methods and systems as appropriate.

Although DOE anticipates accidents would occur in transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain, it does not anticipate that an accident would lead to a release of radioactive materials from a shipping cask. Nevertheless, the Price-Anderson Act provides for indemnification of liability up to $9.43 billion to cover claims that might arise from an accident in which radioactive materials were released or one in which an authorized precautionary evacuation was made (see Section M.8 of the EIS for a more complete discussion of the Price-Anderson Act). If the damage from a nuclear incident appeared likely to exceed that amount, the Price-Anderson Act contains a Congressional commitment to thoroughly review the particular incident and take whatever action is determined necessary to provide full and prompt compensation to the public.

U.S. Department of Transportation regulations in Volume 49 of the Code of Federal Regulations and DOE's own Transportation Practices (see Appendix M of the EIS) would apply to shipments of spent nuclear fuel and high-level radioactive waste. Included are requirements for training of transportation personnel who are responsible for the safety of shipments, safety of vehicles, shipping documentation, financial responsibility of transportation carriers, emergency response notification, driving and parking requirements (including DOE requirements for transportation during severe weather conditions), and other requirements.

Section 180(c) of the NWPA requires DOE to provide technical assistance and funds to states for training of public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions the Department would transport spent nuclear fuel and high-level radioactive waste. The training would cover procedures required for safe routine transportation of these materials, as well as procedures for addressing emergency response situations. DOE would provide the assistance based on the training needs of the states and tribes, as they determined using a planning grant and based on availability of funds in annual Program budgets specified by Congress. Additional Federal response capabilities, such as expert services from the Radiological Assistance Program Team, could be activated, as requested by states and tribes. The schedule in the proposed policy and procedures for implementation of Section 180(c) of the NWPA (63 *FR* 23753; April 30, 1998) is designed to provide adequate time for training of first responders in advance of the first shipments. If there was a decision to proceed with the development of a repository at Yucca Mountain, shipping routes would be identified at least 4 years before shipments began and Section 180(c) assistance would be made available approximately 4 years prior to shipments through a jurisdiction. See Section M.6 of the EIS for a discussion of the DOE Section 180(c) policy and procedures.

In addition, DOE would employ satellite tracking and, in accordance with Nuclear Regulatory Commission regulations, provide advance notification to state, tribal (subject to Nuclear Regulatory Commission approval), and local officials for each shipment of spent nuclear fuel. DOE maintains a national radiological emergency response capability that is available to assist states and tribes in the event of a transportation accident (see Appendix M of the EIS).

DOE investigated the potential impacts of transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain would have on multiple resource areas not related to human health and safety: land use; air quality; biological resources and soils; hydrology; cultural resources; socioeconomics; noise; aesthetics; waste management; utilities, energy, and materials; and environmental justice (see Chapter 6 of the EIS). The Department concluded that the impacts in these resource areas from nationwide transportation (outside Nevada) would not be discernible because shipments would use existing highways and railroads and would contribute only minimally to the volume of national transportation (0.007 percent of railcar kilometers and 0.008 percent of truck kilometers). Although radiological health and traffic fatality impacts would be adverse, because these potential impacts nationwide would not be high for any individual or identifiable group, including Native American tribes, DOE also concluded that transportation of these materials would not raise environmental justice concerns.

As discussed in the EIS, to provide for transportation of rail casks to Yucca Mountain, DOE could construct a branch rail line in one of five candidate rail corridors or could work with the State of Nevada to upgrade one of five highway routes for heavy-haul trucks and, in that case, construct an intermodal transfer facility. For three of the candidate routes for heavy-haul trucks and for purposes of analysis of socioeconomic impacts of heavy-haul truck shipments in Nevada, DOE assumed availability of loaned funds from sources external to Nevada to assist in accelerating construction of the Las Vegas Beltway, if needed. Heavy-haul truck shipments would not travel through the Spaghetti Bowl interchange of Interstate-15 and U.S. 95 in Las Vegas. For the three alternative routes that would pass through the Las Vegas Valley, these trucks would need to use a section of the Las Vegas Beltway to transit from Interstate-15 to U.S. 95 before continuing to Yucca Mountain. DOE's analysis of potential impacts in Section 6.3.3.1 considered the likelihood that large, heavy-haul trucks would affect traffic flow on roads that they would use, including causing delays to traffic on the Las Vegas Beltway. These shipments would be made under permits issued by the State of Nevada that would contain restrictions designed to minimize the effects on traffic of the large trucks.

In its evaluation of potential impacts of constructing a branch rail line in each rail corridor and of upgrading highways for use by heavy-haul trucks and constructing an intermodal transfer station in Nevada, DOE considered the potential impacts that could occur both to the natural environment and to communities, such as Caliente, that

would be nearby (see Sections 6.3.2 and 6.3.3 of the EIS). For example, in the Garden Valley west of Pioche in northeastern Nye County, DOE biologists found the Welsh's catseye plant, classified as a sensitive species by the Bureau of Land Management, about 2.7 kilometers (1.7 miles) from a potential alignment of the Caliente Corridor (DIRS 104593 CRWMS M&O 1999). In this area, DOE identified potential variations in the Caliente Corridor alignment that could avoid a sensitive environmental feature or other feature that could affect the engineering or construction of the route. In the Carlin Corridor, DOE identified numerous springs within 5 kilometers (3 miles) of the alignment of a branch rail line. At the north end of this corridor, DOE biologists identified a hot spring approximately 0.5 kilometer (0.31 mile) east of Nevada Route 306 about 5 kilometers south of Interstate-80. DOE would locate the alignment of a branch rail line to minimize the potential to affect springs and wet areas.

If a corridor was selected for construction of a branch rail line, DOE would conduct field studies along the corridor that would identify sensitive ecological, and cultural resources, and specific land uses to be avoided. DOE would minimize land-use impacts and would avoid private land to the maximum possible extent. DOE would determine how to best avoid detrimental impacts; for example, in some areas, fences could be recommended to protect livestock and open culverts could allow access to both sides of the track.

In light of the comments received on the Draft EIS concerning perceived risk, DOE examined relevant studies and literature on perceived risk and stigmatization of communities to determine whether the state-of-the-science in predicting future behavior based on perceptions had advanced sufficiently since the scoping process for the EIS to allow DOE to quantify the impact of public risk perception on economic development or property values in potentially affected communities (see Section 2.5.4 and Appendix N of the EIS). Of particular interest were scientific and social studies conducted in the past few years that relate directly either to Yucca Mountain or to DOE actions such as the transportation of foreign research reactor spent nuclear fuel. In addition, DOE reevaluated the conclusions of previous literature reviews such as those conducted by the Nuclear Waste Technical Review Board and the State of Nevada, among others. DOE has concluded that:

- While in some instances risk perceptions could result in adverse impacts on portions of a local economy, there are no reliable methods whereby such impacts could be predicted with any degree of certainty.

- Much of the uncertainty is irreducible.

- Based on a qualitative analysis, adverse impacts from perceptions of risk would be unlikely or relatively small.

While stigmatization of southern Nevada can be envisioned under some scenarios, it is not inevitable or numerically predictable. Any such stigmatization would likely be an aftereffect of unpredictable future events, such as serious accidents, would not expect such accidents to occur. As a consequence, DOE addressed but did not attempt to quantify any potential for impacts from risk perceptions or stigma in this Final EIS.

8.1 (518)
Comment - EIS000253 / 0002
The DEIS does not adequately detail proposed shipping routes or the training and equipment necessary for local emergency response personnel in communities along the routes. COPEEN is concerned about the number of shipments that would travel along the I-70 corridor. These shipments would pass through communities that are already overburdened by exposure to numerous hazardous and toxic materials. These Northeast Denver communities are lower-income communities of color who are exposed to higher than average environmental hazards-shipments to Yucca Mountain would only increase their exposure. COPEEN demands that the Department of Energy propose alternative transportation routes. Additionally, COPEEN expects to see detailed training and community education plans regarding the Yucca Mountain shipments. Local emergency response personnel must be adequately trained on how to handle a situation should one arise.

Response
Appendix J in the EIS includes state maps of the routes used in the analysis of national transportation. Although these are the routes that were used to analyze potential impacts, these are not necessarily the routes that would be used for the transport of high-level radioactive waste and spent nuclear fuel to a repository at Yucca Mountain. As stated in the EIS (see Section 2.1.3.2.2), a truck carrying a shipping cask of high-level radioactive waste or spent nuclear fuel would travel to the repository in accordance with U.S. Department of Transportation regulations

(49 CFR 397.101), which require the use of preferred routes. These routes include the Interstate Highway System, including beltways and bypasses. Alternate routes could be designated by states and Native American tribes following Federal regulations (49 CFR 397.103) that require consideration of the overall risk to the public and prior consultation with affected local jurisdictions and with any other affected states and tribes. The highway routes that would be used would be selected in accordance with these Federal transportation regulations and would not be selected by DOE. However, in accordance with Federal regulations, states, including Colorado, may propose alternate routes to better meet local or regional conditions. The process for selecting and approving routes, including state and tribal consultation, is described in Section M.3 of the EIS.

DOE believes that the mostly rail case, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. To reach this conclusion, DOE considered whether sites are able to handle larger (rail) casks, distances to suitable railheads, and historic precedent in actual shipments of fuel, waste, or other large reactor-related components. DOE also has considered relevant information published by knowledgeable sources such as the Nuclear Energy Institute and the State of Nevada. The analysis has confirmed DOE's belief that the mostly legal-weight truck and mostly rail scenarios provide the range (lower and upper bound) of environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste.

The potential environmental justice impacts of transportation activities are discussed in Section 6.1.2.12 of the EIS.

In response to comments, the EIS has been revised and now provides information about emergency response capabilities in Appendix M. With respect to emergency response training, as required by Section 180(c) of the NWPA, DOE would provide technical assistance and funds to states for assessing the need for and training for public safety officials of appropriate units of local government and Native American tribal governments through whose jurisdictions it would transport spent nuclear fuel and high-level radioactive waste. Training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would institute this training before beginning shipments to the repository. In the event of an incident involving high-level radioactive waste or spent nuclear fuel, the transportation vehicle crew would notify local authorities and the central communications station monitoring the shipment. DOE would make resources available to local authorities, if requested, to respond to such an incident. However, state and tribal governments have a primary responsibility to respond to and protect the public health and safety in their jurisdictions in accidents involving radioactive materials. The EIS does not include detailed training and community education plans. Such plans would be developed by state, local, and tribal agencies and governments.

8.1 (1378)
Comment - EIS000432 / 0006
The next problem I have with the proposal is the transportation. The idea of having radioactive waste on our highways does not seem like a good one. If an accident occurred in a major city and the radioactive waste was spilled what would happen? I didn't find any information on what the DOE or the government would do if this occurred. All I found was possible impacts that didn't make sense. From 1 to 4 traffic fatalities would be likely to occur due to traffic accidents? That's what the DOE said. But if a traffic accident occurred and radioactive waste was spilled I think there is a much higher potential for deaths. Furthermore, the DOE is planning on 49,500 trucks shipments from different plants across the country to the Yucca Mountain site in Nevada. With this many trucks on the highways I think there is substantial potential for an accident; along with trucks they have proposed to use railways as a source of transportation. Maybe the railways might be safer, but if there are 300 shipments there is a possibility for a major accident as well.

Response
Although, given the number of shipments, traffic accidents would be probable, DOE does not believe that any accident would result in the release of radioactive material, primarily because of the structural integrity of the casks in which the material would be transported. The EIS contains a discussion of potential impacts from accidents in both the mostly legal-weight truck scenario and the mostly rail scenario (see Section 6.2.4.2). Though an accident resulting in release of radioactive material is not expected to occur, the Department analyzed the maximum reasonably foreseeable accident that would involve the release of radioactive material from a transportation cask. Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). DOE has concluded that the models used for analysis

in the Draft EIS relied on assumptions about spent nuclear fuel and cask response to accident conditions that caused an overestimation of the resulting impacts. Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments of spent nuclear fuel in the United States over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

8.1 (1656)
Comment - EIS000359 / 0002
There's also been a lot of discussion this afternoon, as is correct to have this amount of discussion, on nuclear waste transportation. It's the issue that affects most of the country, with highways and railroads going past all of our communities. And I think all parties can agree that public health and safety and protection of the environment are vitally important. And that is a primary goal that I saw in the Draft Environmental Impact Statement.

Response
Chapter 6 and Appendix J of the EIS does provide a comprehensive analysis of worker and public health and safety and Section 6.3 provides a comprehensive assessment of potential environmental impacts. The results are that impacts would be small for national and Nevada transportation of spent nuclear fuel and high-level radioactive waste.

The Department agrees that sufficient information on public health and safety and environmental protection of the national and Nevada transportation and their potential impacts is provided in the EIS to support current decisionmaking.

8.1 (2218)
Comment - EIS000621 / 0008
Will the Crescent Valley airport be restricted? It goes right into the quarter mile corridor.

Response
Until DOE selected a corridor and determined the alignment of a route in that corridor, it would be unclear if there was a potential for repository-related transportation activities to affect specific land uses. On the other hand, DOE would consider existing uses both in its selection among the alternative corridors and the final alignment of the route in the corridor. The Department would endeavor to minimize the consequences of its routing decisions on existing uses in the selected corridor. It is unlikely that restrictions would be placed on use of the Crescent Valley airport because of DOE shipments on a branch rail line in the Carlin Corridor.

8.1 (2265)
Comment - EIS000394 / 0002
The transportation of spent nuclear fuel and high-level waste from the various points of generation to a national repository is of keen interest to Georgia. Public acceptance of transportation of spent nuclear fuel in the U.S. is not a given, as media reports of recent and upcoming shipment campaigns will attest. Public acceptance of the risks of transporting spent nuclear fuel and high-level radioactive waste, however small or large they are, or are perceived to be, is critical to the success of this program. A strong, credible education and public outreach program is essential to achieving some measure of public acceptance for this program, as is the existence of knowledgeable emergency response personnel at the state and local level, armed with both the training and equipment which would be required to respond to a transportation incident involving spent nuclear fuel or high-level radioactive waste.

Response
DOE conducted 21 public hearings across the nation to solicit input on this EIS during a 199-day comment period. In addition to announcements in the *Federal Register*, the Department placed advertisements for each hearing in local or regional newspapers and provided notices to local media outlets, public service announcements on radio and television stations, and notices to state senators and congressional representatives, governors, mayors, and county commissions. As part of continuing its efforts to inform the public about the Proposed Action, DOE placed maps of

the routes analyzed in the EIS on the Yucca Mountain Project web site and added them to the Final EIS. (As noted throughout the EIS, the analyzed routes might not be the routes used for shipment to the repository. DOE would identify actual routes about 5 years before shipments would begin.)

A major element of the Yucca Mountain Project has been to ensure that stakeholders, the media, and the public have an opportunity to participate in and acquire the information they need to make informed decisions about the project. This effort focuses on building and maintaining relationships with stakeholders, the public, and the media through regular interaction and provision of project information. The program develops public information products, including permanent and portable field exhibits, information materials, exhibits and models, audiovisuals, electronic media, publications, and public outreach announcements. These sources are available at science centers in Las Vegas, Pahrump, and Beatty, Nevada; on the Yucca Mountain and Office of Civilian Radioactive Waste Management Internet sites (*www.ymp.gov* and *www.rw.doe.gov*); through public meetings and hearings on Yucca Mountain topics; and during public tours of the Yucca Mountain site, as well as by specific inquiries and requests for information materials. DOE provides speakers and technical experts to local, state, national, and international technical groups, community groups, professional organizations, students, and other audiences on Yucca Mountain topics, and has created programs and materials to enhance the awareness of area educators and students on issues related to the disposal of spent nuclear fuel and high-level radioactive waste. Information on Yucca Mountain public outreach activities is available at 1-702-295-1312 or 1-800-225-6972.

As to emergency response capabilities, DOE is required by Section 180(c) of the NWPA to provide technical and financial assistance to states and Native American tribes to support training for emergency responders. Part of this support is the determination of needed training that is based on plans developed by responsible jurisdictions. Additional information on Section 180(c) requirements and other emergency response capabilities and responsibilities are provided in Sections M.6 and M.5 of the EIS.

DOE believes that sufficient information on transportation of spent nuclear fuel and high-level radioactive waste has been and continues to be provided to the public and responsible authorities. The Department also believes that sufficient information on emergency preparedness training and equipment is provided in the EIS to support current decisionmaking.

8.1 (2315)
Comment - EIS000571 / 0002
In the previous session I was informed that this waste would be traveling over the Donner overpass. Well, what happens to the people, because there are houses by the Donner overpass?

So what happens if, say, a truck or something else is traveling down the road and perhaps they wreck or they derail, depending on what it is, and these tubes go down rolling down the hill? They are going at very fast speed when they are going down the hill, and they are round. Perhaps they are going 60, 70 miles down the hill and they crash into a tree or something. What happens if they crack [casks] and somehow this radioactivity gets out into our public and then it will start harming people.

Response
Section J.1.2 of the EIS provides maps and tables that indicate the number and routing that DOE used for analysis in the EIS of shipments from 77 sites in the United States to Yucca Mountain. Many tables in this section indicate the origin, miles to be shipped, and number of shipments that the Department has estimated would originate in and pass through each state. The tables in the maps include potential impacts in each state associated with a national campaign to transport high-level radioactive waste and spent nuclear fuel to the proposed repository at Yucca Mountain (see Section 6.2.3). Section 6.3.1.3 discusses the impacts to maximally exposed persons along a legal-weight truck route. The estimated impact would be about 6 millirem. The average background radiation dose in the United States is about 300 millirem, indicating that the maximally exposed person receives a small dose and the dose to the average person along a legal-weight truck route would be much smaller.

The EIS contains a discussion of potential impacts from accidents in both the mostly legal-weight truck scenario and the mostly rail scenario (see Section 6.2.4.2). Though an accident resulting in release of radioactive material is not expected to occur, the Department analyzed the maximum reasonably foreseeable accident that would involve the release of material from a transportation cask. Since the publication of the Draft EIS, the Nuclear Regulatory

Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). DOE has concluded that the models used for analysis in the Draft EIS relied on assumptions about spent nuclear fuel and cask response to accident conditions that caused an overestimation of the resulting impacts. Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

8.1 (2819)
Comment - EIS000935 / 0001
I live in Kirkland between two railroads only one mile apart from each other. I feel a great threat to my life and for my family. I do not want to see another Times Beach story of evacuation. Not even a Francis Howell episode. These town were destroy[ed] by Gov. contamination. Has not Missouri had enough radioactive or chemical problems.

This is the Madrid fault area for earthquakes. Train derailment is going to happen.

There should be another alternative.

The unsinkable Titanic sank. The construction of the cast could shield us but not 100%.

Response
A transportation accident that would involve the release of radioactive material from a transportation cask is not expected to occur during the transportation campaign. The Department analyzed the maximum reasonably foreseeable accident that would involve the release of material from a transportation cask. Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). DOE has concluded that the models used for analysis in the Draft EIS relied on assumptions about spent nuclear fuel and cask response to accident conditions that caused an overestimation of the resulting impacts. Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

Although it is extremely unlikely, the EIS does include a discussion of potential impacts from accidents (including those induced by an earthquake) in both the mostly legal-weight truck scenario and the mostly rail scenario (see Section 6.2.4.2).

8.1 (3146)
Comment - EIS000642 / 0003
Will mining claims be divided and access restricted? There are many claim holders out here, people who are looking for additional mineral deposits. We feel that it is inadequately addressed in the EIS.

Will the Cortez Mine be given its own railroad overpass to continue its daily operations? As one can see on the map on the wall, the corridor goes right through their operations. They have a mill on each side of the valley, and these things are inadequate. They have not been addressed in the EIS, the Draft EIS.

Response
If the repository proposal proceeds, final corridor selection and alignment would be necessary before determinations could be made regarding the nature and locations of crossings and other facilities. Alignment decisions could result in route locations that do not impede the operation of existing facilities.

At this time, definitive information is not available on specific tracts of land that could be required for a given transportation alternative. For any land that would be required or otherwise affected, the Department would fairly compensate landowners under Federal acquisition procedures. Should DOE be required to exercise its right of eminent domain, it would do so pursuant to applicable laws and regulations.

8.1 (3297)
Comment - EIS000986 / 0003
In addition, the DOE informs me that it will take approximately 24 years to complete all the waste shipments from these commercial and DOE facilities to the repository at Yucca Mountain. Given that extensive period of time and the thousands of required shipments, it is highly unlikely that this transport will be completed within an accident. Our region simply cannot afford to have this waste travel through the area. The risks to the public health are much too great.

Response
The risks of transporting spent nuclear fuel and high-level radioactive waste to a repository have been analyzed and the results of the analyses are presented in Chapter 6 of the EIS. The conclusions reached are that the risks and impacts are almost negligible. Of the thousands of shipments of spent nuclear fuel completed over the last 30 years, none has resulted in an identifiable injury from the release of radioactive material.

The EIS acknowledges that transportation accidents are likely to occur during the transport of radioactive materials to the proposed Yucca Mountain Repository. In Section J.1.4.2.3.2, the EIS estimates the number of accidents under the mostly legal-weight truck shipping scenario and accidents under the mostly rail scenario. A recent study concluded that only a tiny fraction of all accidents, less than one in 10,000, would be severe enough to cause a failure in a spent nuclear fuel shipping cask (DIRS 152476-Sprung et al. 2000). The reason for this is the rigorous design, performance, and testing requirements (see 10 CFR Part 71) for spent nuclear fuel and high-level radioactive waste shipping casks. Based on these statistics, DOE does not expect an accident to occur that would result in a radiological release and subsequent environmental cleanup. For additional information on the regulations, practices, and equipment which have contributed to this safety record and would be followed and utilized in the future, see Appendix M.

8.1 (4121)
Comment - EIS002239 / 0007
Looking at the mostly truck scenario, a hundred percent truck; and mostly rail, 95 percent truck. Neither of those is realistic.

What's realistic -- and if you look at realistic, I'm relating it not just to this document, but to the way the Department of Energy has planned to privatize the transportation system. Private sector corporations have to be able to make money moving this stuff.

When you look at all of those considerations, it's most likely that about 60 percent of the waste can be moved by rail, and 40 percent will move by truck. We have got a scenario where we have modeled this -- we call it the current capabilities scenario.

The Draft EIS fails to bound the full impacts of transportation. Now, this may sound strange until you actually model it, but a combination of 60 percent rail and 40 percent truck actually has more impact than 100 percent either way, and that's because you have more routes in more states, more Indian tribes and more counties affected; and at the very least, the amount of expenditures and concerns we have for emergency response training goes up.

Response
The EIS considers two national transportation scenarios, mostly legal-weight truck and mostly rail (see Sections 2.1.3.2.1 and 6.2). As shown in Section J.3.1.3, these scenarios illustrate the broadest range of operating conditions

relevant to potential impacts to human health and the environment. Sensitivity studies, described in this section, indicate that there is little difference in impacts for a wide variety of alternative legal-weight truck routes. The Department does not anticipate that either the mostly legal-weight truck or the mostly rail scenario represents the actual mix of truck or rail transportation modes it would use. Rather, these two scenarios represent the two extremes in the possible mix of transportation modes. The analysis of the potential impacts associated with each of these scenarios provides DOE with an envelop of impacts to understand all of the potential impacts associated with Proposed Action and to make future decisions regarding a transportation mode. DOE believes that the mostly rail case, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. As stated in the EIS, DOE has identified mostly rail as the preferred national mode of transportation.

8.1 (4440)
Comment - EIS001038 / 0007
He [Senator Richard Bryan of Nevada] cited DOT statistics that "over a 10 year period there were more than 99,000 transport accidents releasing hazardous materials." Accidents happen. And where? So far, most of the country can only guess.

Response
The EIS contains a discussion of potential impacts from accidents in both the mostly legal-weight truck scenario and the mostly rail scenario (see Section 6.2.4.2). Though an accident resulting in release of radioactive material is not expected to occur, the Department analyzed the maximum reasonably foreseeable accident that would involve the release of materials from a transportation cask. Since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). DOE has concluded that the models used for analysis in the Draft EIS relied on assumptions about spent nuclear fuel and cask response to accident conditions that caused an overestimation of the resulting impacts. Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

8.1 (4663)
Comment - EIS001372 / 0006
Another critical component of the Yucca Mountain Project is the transportation issue. Nearly 100,000 metric tons of nuclear waste on as many as 79,300 truck and 12,600 rail shipments would travel by rail and highway through 43 states, within a half-mile of 52 million people in casks that have not been fully or safely tested for a 30 year period. There are a great many concerns about this aspect of the proposal. First, according to government figures, approximately 50-260 accidents would occur and 250-900 "incidents" would be expected over the 30-year period. How can we afford to even have one accident occur during the transportation of high-level radioactive waste! We cannot! It is evident from reading the DEIS that this aspect is very shortsighted.

Response
As stated in Section 2.1.3.2 of the EIS, under the mostly legal-weight truck scenario about 53,000 shipments of spent nuclear fuel and high-level radioactive waste would travel on the Interstate Highway System over a 24-year period. For the mostly rail scenario, approximately 9,600 railcars would travel on the nationwide rail network over the same period. Although traffic accidents would be probable given the number of shipments, DOE does not believe any accident would result in the release of radioactive material, primarily because of the structural integrity of the casks in which it would transport the material. In the more than 2,700 shipments involving spent nuclear fuel over the past 3 decades, there has not been a release of radioactive materials to the environment.

The EIS discusses potential impacts from accidents under the mostly legal-weight truck and mostly rail scenarios (see Section 6.2.4.2). Approximately five traffic fatalities could occur in transporting spent nuclear fuel and high-level radioactive waste under the mostly legal-weight truck scenario during the 24 years of operation and 350 million kilometers (220 million miles) of highway travel. In the mostly rail scenario, there could be approximately

three traffic and train accident fatalities. The maximum reasonably foreseeable accident would involve the release of material from a transportation cask. The shipping casks used to transport these spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents. This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

With respect to costs associated with an accident involving nuclear waste, the Price-Anderson Act, as discussed in Section M.8 of the EIS, establishes a system of financial protection for persons who might be liable for or injured by a nuclear accident or incident. The Price-Anderson Act provides liability coverage to DOE activities (including transportation) involving spent nuclear fuel, high-level radioactive waste, and transuranic waste. Specifically, the Act establishes a system of private insurance and Federal indemnification that generally ensures that as much as $9.43 billion is available to compensate for damages suffered by the public, regardless of who causes the damages. The liability of all responsible parties is limited to the amount of coverage provided by the Price-Anderson system. State, local, and tribal governments cannot be required to provide additional compensation. Price-Anderson indemnification would apply to the operators of a repository at Yucca Mountain and to transporters of nuclear waste from commercial and DOE sites to the repository.

In addition to Price-Anderson indemnification, the Motor Carrier Act of 1980 and its implementing regulations (49 CFR Part 387) require vehicles carrying spent nuclear fuel or high-level radioactive waste to maintain financial responsibility of at least $5 million, which would be available to cover public liability from a non-nuclear incident and for environmental restoration. Federal law does not require rail, barge, or air carriers of radioactive materials to maintain liability coverage, although these carriers often voluntarily carry such insurance. Regardless of whether the carrier had insurance, an incident involving these carriers would be subject to state law applicable for any type of accident.

The Nuclear Regulatory Commission would certify casks used for the transport of spent nuclear fuel and high-level radioactive waste (10 CFR Part 71). Section M.4 of the EIS provides more details on the Commission testing and certification program for transportation casks.

8.1 (5912)
Comment - EIS001622 / 0028
Some routes leading to the Nevada Test Site/Yucca Mountain area are heavily traveled tourist and recreational routes. These routes can be greatly impacted by increased truck traffic. Increased truck traffic (especially those hauling nuclear waste) could influence the safety, reliability and congestion characteristics of these routes. Additionally, none of these non-Interstate routes are suitable for the safe and efficient transport of HLNW. None of these routes were designed for heavy trucks, high truck volumes, or quick emergency response.

Response
The EIS analyzed the potential impacts in Nevada of the mostly legal-weight truck scenario and the use of heavy-haul trucks under the mostly rail scenario (see Section 6.3). Under the mostly legal-weight truck scenario, highway shipments would be restricted to specific routes that satisfy the regulations of the U.S. Department of Transportation (49 CFR Part 397). Because the State of Nevada has not designated preferred alternate routes, only one combination of routes for legal-weight truck shipments would satisfy U.S. Department of Transportation routing regulations (Interstate-15 to U.S. 95 to Yucca Mountain). Legal-weight truck shipments in Nevada of spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site would be a very small fraction of the total traffic [less than 1.2 million kilometers (750 thousand miles) per year for legal-weight truck shipments in Nevada in comparison to an estimated 1.2 billion kilometers per year of commercial vehicle traffic on Interstate-15 and U.S. 95 in Southern Nevada].

DOE recognizes that use of heavy-haul trucks would require upgrading of some Nevada highways, and has included the potential environmental impacts and costs of such upgrades in the EIS (see Section 6.3.3). Upgrades would include reconstruction of some highway sections, new turnout lanes at frequent intervals, widening of highway shoulders, and improvement of road surfaces.

With respect to quick emergency response, as required by Section 180(c) of the NWPA, DOE would provide technical assistance and funds to states and tribes for training of public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions DOE would transport spent nuclear fuel and high-level radioactive waste. Training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would institute this training before beginning shipments to the repository. In the event of an incident involving high-level radioactive waste or spent nuclear fuel, the transportation vehicle crew would notify local authorities and the central communications station monitoring the shipment. DOE would make resources available to local authorities as appropriate to mitigate such an incident. Additional information on the requirements and implementation of Section 180(c) is provided in Sections M.6 and M.7 of the EIS.

8.1 (6092)
Comment - EIS001265 / 0001
This plan has already been implemented so your next step is to discuss the safest way to transport this nuclear waste through your "valley." This should be your primary reason for meeting and discussion. Being realistic about this is the only way to be, all the yes's and no's mean nothing they are only words it is action to assure the safety of this transportation that counts.

Response
DOE has made no decision regarding the proposed monitored geologic repository at Yucca Mountain. After the EIS has been completed, the Secretary of Energy will decide whether to recommend approval of the development of a monitored geologic repository at Yucca Mountain to the President.

The Secretary of Energy will consider the potential impacts associated with transportation of high-level radioactive waste and spent nuclear fuel when determining whether to recommend Yucca Mountain as the site of the monitored geologic repository. Although no transportation decisions would be made until after completion of the Site Recommendation process, DOE believes that the EIS provides the information necessary to make decisions regarding the basic approaches (for example, mostly rail or mostly truck shipments), as well as the choice among alternative rail corridors in Nevada.

With respect to transportation safety, DOE agrees that the ability to safely transport high-level radioactive waste and spent nuclear fuel to the proposed repository is an integral part of the determination on whether to recommend Yucca Mountain as a site for a repository. The protocols to be used by the Regional Servicing Contractors are listed in Section M.3 of the EIS. These protocols meet the statement made by DOE in Section 2.1.3.2 that the transportation of spent nuclear fuel and high-level radioactive waste would comply with all applicable regulations of the U.S. Department of Transportation and the Nuclear Regulatory Commission.

8.1 (6565)
Comment - EIS001632 / 0052
Section 6.2.1: This section describes how the EIS bounds the impacts to human health, safety and the environment from transportation by examining the two extremes of transportation possibilities mostly rail and mostly legal-weight truck. Based on DOE's analysis, EPA [the Environmental Protection Agency] agrees with DOE's overall assessment that radiological impacts to the public from transportation of wastes to Yucca Mountain will be small.

Response
Thank you for your comment.

8.1 (6793)
Comment - EIS001905 / 0005
The highway routes used in the DEIS make Ohio a major corridor state for truck shipments to Yucca Mountain. Three of the principal truck routes from Eastern reactors enter Ohio from Pennsylvania on I-90, I-80, and I-76;

converge on the Ohio Turnpike (I-80/I-90) at Elyria; and then continue west through Indiana, Illinois, and Iowa on I-80. These routes traverse the Cleveland and Toledo metropolitan areas, and more than 300 miles on rural Ohio interstate highways. Under the mostly truck scenario, proposed action, about 11,200 truck shipments of high-level nuclear waste (about 22% of the total) traverse Ohio over 24 years. Under the mostly truck scenario, modules 1 & 2, about 18,900 truckloads of high-level nuclear waste (about 20% of the total) traverse Ohio over 39 years. Under either scenario, an average of 1.3 trucks per day would travel through Ohio every day for decades.

Response
Considering the number of shipments described in Section 6.1.1 of the EIS and potential routes of shipments described in Section J.1.2, only a fraction of the total volume of spent nuclear fuel and high-level radioactive waste (especially that currently located in the Northeastern United States) would travel through Ohio. Appendix J of the EIS contains maps of individual states and tables for each state listing the number of shipments that DOE estimates would originate and pass through the state and the impacts of those shipments. Assuming the 22 percent figure used by the commenter is correct, less than two additional truck shipments would pass through Ohio on a daily basis. Given the amount of truck travel that already occurs on U.S. highways, including those in Ohio, the additional daily truck shipments would not be expected to cause additional impacts as a result of incident-free transportation.

The EIS addresses the potential impacts associated with a national campaign to transport high-level radioactive waste and spent nuclear fuel to the proposed repository at Yucca Mountain (see Section 6.2.3). DOE believes that the mostly rail case, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. In reaching this conclusion, DOE considered whether sites are able to handle larger (rail) casks, distances to suitable railheads, and historic precedent in actual shipments of fuel, waste or other large reactor-related components. DOE also has considered relevant information published by knowledgeable sources such as the Nuclear Energy Institute and the State of Nevada. The analysis has confirmed DOE's belief that the mostly legal-weight truck and mostly rail scenarios provide the range (lower and upper bound) of environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste.

8.1 (6795)
Comment - EIS001905 / 0006
Rail shipments to Yucca Mountain would also heavily impact Ohio. The DEIS evaluated four rail routing scenarios using the INTERLINE model. Under the DEIS routing scenarios, two major streams of rail shipments to Yucca Mountain converge in Cleveland, at the interchange of Conrail mainlines from Buffalo and Harrisburg. A smaller number of shipments travel the Norfolk Southern from Cleveland to Chicago, the Norfolk Southern from West Virginia to Kansas City via Portsmouth, and the CSXT from Pennsylvania to Chicago via Youngstown and Akron. Rail shipments along these routes total almost 1,000 route miles in Ohio. Under the mostly rail scenario, proposed action, about 2,700 rail shipments (about 25% of the total) traverse Ohio over 24 years. Under the mostly rail scenario, modules 1 & 2, about 4,200 rail shipments (about 21% of the total) traverse Ohio over 39 years.

Response
Considering the number of shipments described in Section 6.1.1 of the EIS and potential routes of shipments described in Section J.1.2, only a fraction of the total volume of spent nuclear fuel and high-level radioactive waste (especially that currently located in the Northeastern United States) would travel through Ohio. Appendix J of the EIS contains maps of individual states and tables for each state listing the number of shipments that DOE estimates would originate and pass through the state and the impacts of those shipments. Given the amount of rail traffic that already occurs on U.S. railways, including those in Ohio, the additional rail shipments would not be expected to cause additional impacts as a result of incident-free transportation.

DOE believes that the mostly rail case, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments of spent nuclear fuel and high-level radioactive waste. To determine this mix, DOE considered whether sites are able to handle larger (rail) casks, distances to suitable railheads, and historic precedent in actual shipments of fuel, waste or other large reactor-related components. In addition, DOE considered relevant information published by knowledgeable sources such as the Nuclear Energy Institute and the State of Nevada. The analysis has confirmed DOE's belief that the mostly legal-weight truck and mostly rail scenarios provide the range (lower and

upper bound) of environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste.

The EIS addresses the potential impacts associated with a national campaign to transport high-level radioactive waste and spent nuclear fuel to the proposed repository at Yucca Mountain (see Section 6.2.3).

8.1 (7148)
Comment - EIS001337 / 0045
During EIS scoping, Lincoln County and the City of Caliente provided DOE with evidence that rail condition can affect accident rates. Reference to County and City sponsored research regular assessments of rail condition along the UP mainline[13] was provided to DOE. The County and City encouraged DOE to an assessment of pre-waste shipment track condition and use within the DEIS. The DEIS is silent on the issue of existing rail condition and implications of rail condition for transportation safety.

[13] ETS Pacific, Inc., Pilot Study and Analysis of 46 Mile Rail Corridor in Lincoln County, Nevada, prepared for the Board of Lincoln County Commissioners, October 1986. See also ETS Pacific, Inc., Condition Update of 46 Mile Rail Corridor in Lincoln County, Nevada, prepared for the Board of Lincoln County Commissioners, June 1989.

Response
DOE recognizes that rail conditions could affect accident rates. The analysis in the EIS used state-specific accident rates and data from a recent Nuclear Regulatory Commission study (see Section J.1.4.2.3.1 of the EIS) of the adequacy of its transportation regulations in 10 CFR Part 71 to estimate the likelihood and severity of transportation accidents. The data from these studies are based on national data collected from actual accidents. Thus, the analysis presented in the EIS uses data derived from accidents where unique local conditions were contributing factors, including the Union Pacific mainline in Nevada.

8.1 (7405)
Comment - EIS001957 / 0025
Section 6.0 Environmental Impacts of Transportation -- The NPS [National Park Service] objects to transportation of nuclear waste materials in and near the boundaries of its management units. Hazardous waste contamination of park land from ancillary transportation is already a major problem. Each year millions of dollars and unnecessary employee time is expended on these issues. These costs drain important funding from areas and projects necessary for the maintenance of park units. The possibility of the spill or inadvertent release of radionuclides within or neighboring a park unit is unacceptable.

State highways adjoin or are adjacent to Death Valley and Great Basin NP's [National Parks] and Lake Mead NRA [National Recreation Area]. Any accidental spills arising from transportation will directly affect the parks. Not only will park resources be affected, but park emergency response staff will be necessarily deployed. The proposed Yucca Mountain transportation plan does not provide for adequate trained emergency response staff or other resources to deal with highway accidents affecting the parks. Relying on NPS [National Park Service] staff to respond to highway accidents involving high-level nuclear waste is unacceptable.

For example, California Highway 127 parallels the drainage of the Amargosa River over a great distance in proximity to Death Valley NP [National Park]. Flow measurements published by the U.S. Geological Survey give evidence of periodic surface flows in that drainage. Flows may originate at Oasis Valley, Forty Mile Wash, or a host of other locations and continue to the terminus of the system at Badwater Basin in the park. The draft EIS provides neither any discussion of the outcome should an accident occur releasing material into the park along this route, nor a risk analysis of this possibility.

The supplemental EIS must address this omission with regard to both Nevada State Highway 95 and California State Highway 127, identifying and assessing scenarios for Great Basin NP [National Park] and Lake Mead NRA [National Recreation Area] (in addition to Death Valley NP [National Park]).

Response
Transportation of spent nuclear fuel and high-level radioactive waste is an integral part of the ultimate disposition of these wastes in a geologic repository and the EIS addresses the potential impacts associated with a transportation

campaign (see Chapter 6). In determining whether to recommend the Yucca Mountain site to the President, the Secretary of Energy would take transportation impacts, including potential impacts to national parks and recreation areas, into account.

Transportation by legal-weight truck would involve shipments along Interstate System highways in accordance with U.S. Department of Transportation regulations (49 CFR Part 397). These regulations limit shipments of hazardous materials such as nuclear waste to Interstate System highways and require shippers to use beltways and bypasses where available. DOE recognizes that even an incident-free transportation campaign could adversely affect people who live, work, or recreate near transportation routes. DOE also recognizes the potential for transportation accidents and analyzed impacts resulting from transportation accidents in the EIS, including contamination of water and food. Given the number of shipments, traffic accidents would be probable. DOE does not believe that any accident would result in the release of radioactive material, primarily because of the structural integrity of the casks (see Section M.5 of the EIS for a discussion of cask safety and testing) in which the material would be transported. In the more than 2,700 shipments involving spent nuclear fuel over the past 3 decades, there have been four accidents, with no release of radioactive materials to the environment.

As required by Section 180(c) of the NWPA, DOE would provide technical assistance and funds to states for training for public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions DOE would transport spent nuclear fuel and high-level radioactive waste. Training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. D OE would institute this training before beginning shipments to the repository. In the event of an incident involving high-level radioactive waste or spent nuclear fuel, the transportation vehicle crew would notify local authorities and the central communications station monitoring the shipment. DOE would make resources available to local authorities as appropriate to mitigate such an incident. Additional information on the elements and implementation of Section 180(c) of the NWPA act is provided in Section M.6 of the EIS.

8.1 (7485)
Comment - EIS001775 / 0002
I sat through four hours of the hearing this morning eager to learn all I could about this project. What I did learn was alarming. Those who have knowledge of nuclear waste and know what questions to ask could not get their questions answered. You kept saying that congress did not require you to address a number of issues. When you were asked about transportation, you said congress told you didn't have to address it. Excuse me? To us here in the midwest, this is about transportation, the transportation of deadly nuclear waste through our streets and cities where our families live, over the rivers where we get our drinking water.

Response
Transportation of spent nuclear fuel and high-level radioactive waste is an integral part of the ultimate disposition of these wastes in a geologic repository and the EIS addresses the potential impacts associated with a transportation campaign (see Chapter 6 and Appendix J of the EIS). In determining whether to recommend the Yucca Mountain site to the President, the Secretary of Energy will take transportation impacts into account.

Transportation by legal-weight truck would involve shipments along Interstate System highways in accordance with U.S. Department of Transportation regulations (49 CFR Part 397). These regulations limit shipments of highly radioactive materials such as nuclear waste to Interstate System highways and require carriers to use beltways and bypasses where available. DOE recognizes that even an incident-free transportation campaign could adversely affect people who live or work near transportation routes. Section 6.2.3.1 of the EIS presents the number of latent cancer fatalities from legal-weight truck transport of spent nuclear fuel and high-level radioactive waste for the 24-years of operation. DOE also recognizes the potential for transportation accidents and analyzed impacts resulting from transportation accidents in Section 6.2.4. Although, traffic accidents would be probable given the number of shipments, DOE does not believe that any accident would result in the release of radioactive material, primarily because of the structural integrity of the casks in which the material would be transported. In the more than 2,700 shipments involving spent nuclear fuel over the past 3 decades, there have been four accidents, with no release of radioactive materials to the environment.

The EIS states that approximately five traffic fatalities could occur in the course of transporting high-level radioactive waste and spent nuclear fuel under the mostly legal-weight truck scenario during the 24 years of

operation and 350 million kilometers (220 million miles) of highway travel. In the mostly rail scenario, there could be approximately three traffic and train accident fatalities. Though an accident resulting in release of radioactive material is not expected to occur, DOE analyzed the maximum reasonably foreseeable accident would involve the release of material from a transportation cask. The shipping casks used to transport these spent nuclear fuel and high-level radioactive waste would be massive and tough with design features that complied with strict regulatory requirements that ensure the casks performed their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that, of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each with less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

8.1 (8925)
Comment - EIS001028 / 0001
I am concerned about the danger inherent in transporting vast amounts of radioactive waste through 43 states over a period of 25 years through population centers such as St. Louis.

I am not satisfied that the NRC [Nuclear Regulatory Commission] has conducted satisfactory tests to determine the safety of transporting the waste. Amy Shollenberger, senior policy analyst for Critical Mass, has charged that the NRC is relying on computer-simulated tests, rather than on tests of real transportation containers. She recommends that the NRC change it testing methods to ensure it gets an accurate idea of the dangers involved.

Response
To transport spent nuclear fuel or high-level radioactive waste to the proposed repository, DOE would use shipping casks that met Nuclear Regulatory Commission regulations (10 CFR Part 71). DOE is required to comply with these regulations. The extent to which the Nuclear Regulatory Commission should reexamine the methodology it uses to certify casks as adequately protective of public health and safety is beyond the scope of the EIS. However, Section M.4 of the EIS provides additional information about the modeling and testing and the safety of transportation casks for spent nuclear fuel and high-level radioactive waste.

Section 6.2.3 of the EIS describes the impacts of transporting spent nuclear fuel and high-level radioactive waste on national highways and rail lines, including transport through urban, suburban, and rural populations. Section J.1.2.2 describes the basis for and methods used to determine the number of miles, speeds, and populations in each of these three areas for each route used in the analysis. These data were used in the analysis for public collective, public resident, and maximally exposed individual doses recorded in Section 6.2.3.

8.1 (9411)
Comment - EIS001888 / 0106
Maps presented in the DEIS are also fundamentally misleading. No national routes are depicted in the report. Many of the people who are most affected by the program, therefore, will not be aware of the impact based on the report's contents.

Response
Appendix J of the EIS includes maps of each state through which shipments of spent nuclear fuel and high-level radioactive waste could originate or pass. The maps identify the routes used in the analysis of national transportation. In addition, the maps contain tables listing the number of shipments that DOE estimates would originate in and pass through the state along with the impacts for each state based on the numbers and routes of shipments. The impacts in each state were estimated using route specific information such as projected number of shipments, along-route populations; route lengths in urban, suburban, and rural areas; and state-specific accident rates. Although these are the routes that were used to analyze potential impacts, these are not necessarily the routes that would be used for the transport of high-level radioactive waste and spent nuclear fuel to a repository at Yucca

Mountain. As stated in Section 2.1.3.2.2 of the EIS, a truck carrying a shipping cask of high-level radioactive waste or spent nuclear fuel would travel to the repository in accordance with U.S. Department of Transportation regulations (49 CFR 397.101), which require the use of preferred routes. These routes include the Interstate Highway System, including beltways and bypasses. Alternate routes could be designated by states and Native American tribes following Department of Transportation regulations (49 CFR 397.103) that require consideration of the overall risk to the public and prior consultation with affected local jurisdictions and with any other affected states and tribes. The highway routes would be selected in accordance with these Federal transportation regulations and would be approved by the Nuclear Regulatory Commission.

DOE believes that the mostly rail case, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. In reaching this conclusion, DOE considered whether sites are able to handle larger (rail) casks, distances to suitable railheads, and historic precedent in actual shipments of fuel, waste or other large reactor-related components. DOE also considered relevant information published by knowledgeable sources such as the Nuclear Energy Institute and the State of Nevada. The analysis has confirmed DOE's belief that the mostly legal-weight truck and mostly rail scenarios provide the range (lower and upper bound) of environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste.

8.1 (9495)
Comment - EIS001888 / 0155
[Summary of comments noted by Clark County Nuclear Waste Division staff at various citizens' meetings.]

One person felt that it was a good thing because it would bring high paying trucking jobs to the community. He didn't think there was a radiological risk and cited his knowledge of a mine in Canada that was so radioactive that it made the stuff that would be coming to Yucca Mountain looks like spit - the stuff in Canada was magnitudes of times greater in radioactivity. He said that if we didn't want the waste shipped here, Canada would take it there and reap the economic benefits.

Response
Chapter 6 and Appendix J of the EIS provides a comprehensive analysis of worker and public health and safety risks. The results are that impacts would be small for national and Nevada transportation of spent nuclear fuel and high-level radioactive waste.

8.1 (9557)
Comment - EIS001888 / 0230
Other data is also apparently flawed. In 1998, Clark County received geographic data files from DOE. These data files were for the proposed implementing alternatives through Nevada to Yucca Mountain. Cartographers from Clark County's Geographic Information Systems Department found that the files provided by the DOE incorrectly located major features (e.g. Interstate 15).

Response
Appendix J of the EIS contains state maps for all states where shipments of spent nuclear fuel and high-level radioactive waste could originate or through which they could pass. The maps include numbers of shipments, alternative routes, and impacts by state. The routes designated on the maps are those used for the impact analysis in the EIS and are similar to the results given in Chapter 6. The impacts in each state were estimated using route specific information such as projected number of shipments, along-route populations; route lengths in urban, suburban, and rural areas; and state-specific accident rates.

8.1 (9594)
Comment - EIS001888 / 0268
Maintenance Facilities and Support Operations

Hazardous materials transporters currently have elaborate, effective agreements for managing maintenance and support operations. These agreements have served the HAZMAT [hazardous materials] industry well for many years, however, it is not clear that the same institutional architecture will be adequate to service the specialized

equipment used to transport SNF [spent nuclear fuel]. The DEIS should provide a clear description of arrangements that will be made to provide en route maintenance and support.

Response
The EIS includes a discussion of TRANSCOM, the satellite-based transportation tracking and communications system that DOE developed to provide continuous tracking and communication with truck and rail shipments of radioactive materials (see Section 2.1.3.2). In addition, the EIS describes the procedures that would be used by the Regional Servicing Contractors to perform the planning and implementation of legal-weight truck and rail shipments nationally and with Nevada. Section M.3 lists the protocols that the Regional Servicing Contractors would use to carry out planning, tracking, acquisition of casks, from shippers, en-route management, emergency management, response to weather and other unexpected conditions, and postshipment reviews, maintenance and record keeping. All of these activities would be performed in compliance with all applicable regulations of the U.S. Department of Transportation and the Nuclear Regulatory Commission, as stated in Section 2.1.3.2.

8.1 (10039)
Comment - EIS001888 / 0526
[Clark County summary of comments it has received from the public.]

The UP mainline is the major link between So. CA & Midwest. Freight transport was 8.7 Million in 1994 up from 6 million in 1990. 80% through traffic, 15% off-loaded & 5% onloaded. This could be hurt by the repository.

Response
As indicated in Section 6.1.1 of the EIS, the proposed shipment of nuclear waste to a repository at Yucca Mountain would involve up to 400 rail shipments per year, over a 24-year period, under the mostly rail transportation scenario. Under the mostly legal-weight truck scenario, there would be approximately 13 additional rail shipments per year (see Section 6.1.1). Because not all rail shipments would travel on the same routes or through the same rail transfer points, the actual number of shipments passing a particular point would be less than the total estimated. This relatively small additional amount of traffic on the rail lines would not be expected to adversely affect existing rail shipments. The extent to which shippers might be reluctant to ship products because of the existence of spent nuclear fuel and high-level radioactive waste on the rail lines is speculative and was not analyzed by DOE.

8.1 (10104)
Comment - EIS002168 / 0001
Where is waste from Cleveland and the East Coast currently being shipped?

Response
Section 2.1.3.2 of the EIS identifies the nuclear utility and Department of Energy sites from which shipments of spent nuclear fuel and high-level radioactive waste would be shipped. Figures in this section identify the Interstate Highway System and national rail system in relation to these sites. Spent nuclear fuel and high-level radioactive wastes are currently mostly stored onsite at 72 commercial locations and 5 DOE sites.

8.1 (10291)
Comment - EIS000936 / 0003
Transporting material from current locations to Yucca Mt. exposes people along the truck routes to potential disastrous accidents. It seems we want to shift the problem from its current locations to another place at tremendous potential damage along the way while gaining nothing from it. So why do it?

Response
The Nuclear Waste Policy Act of 1982 gives the Federal Government the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the health and safety and the environment. The decision to evaluate and use, if suitable, a geologic repository at Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste was a national policy initiative embodied in the Nuclear Waste Policy Amendments Act of 1987. Through the passage of that Act, Congress redirected DOE's implementation of the original Act in several ways, including directing DOE to study only the Yucca Mountain site to determine its suitability as a repository. The Act does not direct DOE to examine any other methods of disposal.

In 1980, the Department published the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980). This EIS examined both geologic disposal and alternatives to geologic disposal, including deep seabed disposal, ice sheet disposal, disposal in deep boreholes, transmutation, and disposal in outer space. The Record of Decision for this EIS concluded, in agreement with the National Academy of Sciences, that deep geologic disposal was the preferred alternative, and that the alternatives to geologic disposal other than continued storage were not technologically viable at the time. The Department agrees with the National Academy of Sciences and therefore does not consider continued storage a solution. Continued storage is viable and safe, but simply postpones the decision to the future in the hope that technology to solve the problem would be developed.

8.1 (10374)
Comment - EIS001371 / 0007
Legal trucks weights are 80,000 pounds per single unit, and there are tandem units which compound the problems. Interstates are built to withstand that weight, and the fees the trucks must pay help the states maintain their highways. Not knowing how heavy the illegal trucks are makes it impossible to gauge speed and other risk factors which could make that truck more prone to an accident. How can DOE calculate the impact of a collision of 80,000 pound tractor trailer? Not to mention the additional risk of possible drug use. These are risks that every motorist takes every time they get on interstate highways. Just the size and the speed of the interstate trucking industry creates and unthinkable environment for DOE to even consider shipping the most hazardous waste in the world through the heartland of America.

Response
In analyzing the potential for transportation accidents involving legal-weight trucks, DOE used national truck accident data (see Section J.1.4.2.3.1 of the EIS). Thus, the analysis has taken into account current conditions on the Nation's highways, including human factors (for example, drug use), as discussed in Section J.1.4.2.1. This risk analysis is contained in Section 6.2.4. Overweight (heavy-haul) trucks would not be used on national highways. They would be used in Nevada under the mostly rail scenario where branch rail lines do not exist to complete transportation to Yucca Mountain.

The EIS states that approximately four traffic fatalities could occur in the course of transporting high-level radioactive waste and spent nuclear fuel under the mostly legal-weight truck scenario during the 24 years of operation and 350 million kilometers (220 million miles) of highway travel. The maximum reasonably foreseeable accident would involve the release of material from a transportation cask. The shipping casks used to transport these spent nuclear fuel and high-level radioactive waste would be massive and tough with design features that complied with strict regulatory requirements that would ensure the casks performed their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

8.1 (10625)
Comment - EIS002220 / 0010
"Armed guards and radiation experts escort a truck transporting a nuclear waste cask from an indoor storage pool at Calvert Cliffs Nuclear Power Plant to an outdoor storage bunker nearby."

Now, you tell me that it's safe and it takes armed guards and radiation experts to escort one truck, one truck, and folks, they're not talking about bringing this for one year. They're talking about 30 years, folks.

You think they're not going to have a whole bunch of accidents in 30 years? And you know if they get it out there, it won't be 30 years because they'll keep generating it back East and they'll be shipping it out to the west. It won't be just 30 years.

Response

The EIS includes a discussion of TRANSCOM, the satellite-based transportation tracking and communications system that DOE developed to track truck and rail shipments of radioactive materials (see Section 2.1.3.2). In addition, Appendix M of the EIS describes the protocols and procedures that would be used for both legal-weight truck and rail shipments. Appendix M describes the protocols and regulations that would be implemented to ensure safe transport of radioactive materials.

While spent nuclear fuel and high-level radioactive waste could continue to be generated, there is a statutory limit (Nuclear Waste Policy Act of 1982) on the mass (weight) of waste that can be emplaced in the first repository (70,000 metric tons of heavy metal). Given this limit, the shipment of spent nuclear fuel and high-level radioactive waste would occur over a 24-year period.

Transportation by legal-weight truck would involve shipments along inter Interstate System highways in accordance with U.S. Department of Transportation regulations (49 CFR Part 397). These regulations limit shipments of highly radioactive materials such as nuclear waste to Interstate System highways and require carriers to use beltways and bypasses where available. DOE recognizes the potential for transportation accidents and analyzed impacts resulting from transportation accidents in Section 6.2.4.2. Given the number of shipments, traffic accidents would be probable. DOE does not believe that any accident would result in the release of radioactive material, primarily because of the structural integrity of the casks in which the material would be transported (see Section M.4 for additional information on cask safety and testing). In the more than 2,700 shipments involving spent nuclear fuel over the past 3 decades, there have been four accidents, with no release of radioactive materials to the environment.

Section 6.2.4.2 of the EIS states that approximately 5 traffic fatalities could occur in the course of transporting high-level radioactive waste and spent nuclear fuel under the mostly legal-weight truck scenario during the 24 years of operation and 350 million kilometers (220 million miles) of highway travel. In the mostly rail scenario, there could be approximately 3 traffic and train accident fatalities. The maximum reasonably foreseeable accident would involve the release of material from a transportation cask. The shipping casks used to transport these spent nuclear fuel and high-level radioactive waste are massive and tough with design features that comply with strict regulatory requirements that ensure the casks perform their safety functions even when damaged. Numerous tests and extensive analyses have demonstrated that casks would provide containment and shielding even under the most severe kinds of accidents. In addition, since the publication of the Draft EIS, the Nuclear Regulatory Commission published *Reexamination of Spent Fuel Shipment Risk Estimates* (DIRS 152476-Sprung et al. 2000). Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

As required by Section 180(c) of the NWPA, DOE would provide technical assistance and funds to states for training for public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions DOE would transport spent nuclear fuel and high-level radioactive waste. Training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would institute this training before beginning shipments to the repository. In the event of an incident involving high-level radioactive waste or spent nuclear fuel, the transportation vehicle crew would notify local authorities and the central communications station monitoring the shipment. DOE would make resources available to local authorities as appropriate to mitigate such an incident. Additional information on emergency response and implementation of Section 180(c) of the NWPA is provided in Appendix M of the EIS.

8.1 (10887)
Comment - EIS000762 / 0003
After considerable effort and a frustrating trial and error exercise, the State of Nevada managed to extract DOE's shipment routes, modes, and shipment numbers from the raw data contained in draft EIS reference materials. (One Nevada transportation consultant employed to assist with the review of the draft EIS likened it to breaking the Japanese military codes during World War II.)

Under DOE's shipping scenario, Utah would be the most heavily affected corridor state for truck shipments to Yucca Mountain. Yet the DEIS makes no particular reference to transportation impacts in Utah. Three major truck routes to Yucca Mountain traverse Utah:

I-15 from Idaho to Arizona (405 miles in Utah);
I-80, I-215, and I-15 from Wyoming to Arizona (381 miles in Utah); and
I-70 and I-15 from Colorado to Arizona (364 miles in Utah).

Depending upon the scenarios evaluated in the draft EIS, between 43,000 and 80,000 truck shipments traverse Utah over 24 years. Under either scenario, an average of 5 to 6 trucks per day would travel through Utah every day for decades. Additionally, Utah would be impacted by about 300 rail cask-shipments of naval reactor spent fuel and about 2,500 truckloads of miscellaneous radioactive wastes during the same time period. (See Table 1 for additional detail on the truck shipments scenario.)

Response
Section J.1.2 of the EIS provides maps of each state, including Utah, and tables that indicate the number and routing of shipments from 77 sites in the United States to Yucca Mountain. Many tables in this section indicate the origin, miles to be shipped, and number of shipments originating in and passing through each state. The impacts in each state were estimated using route specific information such as projected number of shipments; populations along route; route lengths in urban, suburban, and rural areas; and state-specific accident rates. The tables in Section J.1.3 list potential impacts in each state associated with a national campaign to transport spent nuclear fuel and high-level radioactive waste to the proposed repository at Yucca Mountain (see Section 6.2.3).

As stated in Section 2.1.3.2.2 of the EIS, under a mostly legal-weight truck scenario about 53,000 shipments of high-level radioactive waste and spent nuclear fuel would travel on the Interstate Highway System during a 24-year period. Most of these shipments would traverse Utah.

8.1 (11177)
Comment - EIS000232 / 0010
The first you can do right now. You are sitting just a few meters from the railroad tracks over which you propose to transport high-level nuclear waste. Now, transport yourself back in time to New Years Eve 1910. Floodwaters would be twisting those railroad tracks to pretzels. Millions of tons of rock would be raining down from the hillsides onto the railroad. You would be sitting up to your necks in mud the consistency of pancake batter.

The second should wait until tomorrow as you commute back to Las Vegas. Try to envision making the trip on that narrow, curvy road between here and Alamo in a truck that's 270 feet long, has forty wheels, two engines and two drivers, and weighs almost 300 thousand pounds.

Then go back to Washington DC and tell someone they need to re-think their transportation plan.

Response
Shipments of spent nuclear fuel by rail have taken place for over 4 decades without an accident that resulted in breaching of the transportation casks. Over the years, rail safety has improved dramatically using the latest technology (communications, weather reports, etc.) to assist in controlling train traffic to adjust to weather-related problems.

Regarding the comment on using heavy-haul truck on the Caliente-Las Vegas route, most of the road segments are negotiable with a heavy-haul truck at a speed of 40 to 64 kilometers (25 to 40 miles) per hour. This assumes that identified road upgrades have been implemented. At present, approximately 40 heavy-haul vehicles with payloads

in excess of 68 metric tons (75 tons) that are permitted by the Nevada Department of Transportation travel this segment of U.S. 93 each year.

8.1 (11384)
Comment - EIS002230 / 0005
The controversy of such transportation has focused on the adequacy of the Nuclear Regulatory Commission system for shipping the casks, the potential consequences of transportation accidents, and the routes that nuclear waste shipments are to follow.

Response
As stated in Section 2.1.3.2 of the EIS, DOE would comply with all applicable regulations of the Nuclear Regulatory Commission and U.S. Department of Transportation for the transportation of spent nuclear fuel and high-level radioactive waste. These regulations were promulgated to protect public health and safety. DOE recognizes the potential for transportation accidents and analyzed impacts resulting from transportation accidents in Section 6.2.4.2. In response to comments, the EIS has been revised (Section 6.2.4.2) to describe the maximum reasonably foreseeable accident in terms of cask failure mechanisms, range of impact velocities, and temperature range for the accident. Based on the revised analyses, DOE has concluded in the EIS that casks would continue to fully contain spent nuclear fuel in more than 99.99 percent of all accidents. This means that there would be less than a 1 percent chance over 24 years of transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain by truck of an accident that could result in a release of radioactive material from a cask. The chance of a rail accident that would cause a release from a cask is even less. The corresponding chance that such an accident would occur in any particular locale would be much less than 1 percent. Although given the number of shipments traffic accidents would be probable, DOE does not believe that any accident would result in the release of radioactive material, primarily because of the structural integrity of the casks in which the material would be transported. See Section M.4 for more information on cask safety and testing. In the more than 2,700 shipments involving spent nuclear fuel over the past 3 decades, there have been four accidents, with no release of radioactive materials to the environment.

In relation to shipping the casks, DOE expects to hire commercial companies to act as Regional Servicing Contractors in accordance with the NWPA, as amended. The process for procuring these contractors is described in Section M.3 of the EIS and the detailed protocols to be used in loading, shipping and generally managing the transportation activities are described in this section. These protocols are based on the processes developed and implemented for shipments to the Waste Isolation Pilot Project and comply with all applicable U.S. Department of Transportation and Nuclear Regulatory Commission regulations.

With respect to routes, Appendix J in the EIS includes state-by-state maps of the routes and the estimated number of shipments that would originate and pass through each state. These are the routes and shipments used in the analysis of national transportation. Although these are the routes that were used to analyze potential impacts, they are not necessarily the routes that would be used for the transport of high-level radioactive waste and spent nuclear fuel to a repository at Yucca Mountain. As stated in the EIS (see Section 2.1.3.2.2), a truck carrying a shipping cask of high-level radioactive waste or spent nuclear fuel would travel to the repository in accordance with U.S. Department of Transportation regulations (49 CFR 397.101), which require the use of preferred routes. These routes include the Interstate Highway System, including beltways and bypasses. Alternate routes could be designated by states and Native American tribes following Department of Transportation regulations (49 CFR 397.103) that require consideration of the overall risk to the public and prior consultation with affected local jurisdictions and with any other affected states and tribes. The highway routes that would be used would be selected in accordance with these Federal transportation regulations and would need to be approved by the Nuclear Regulatory Commission.

DOE believes that the mostly rail case, in which 95 percent of the spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. To determine this mix DOE considered whether sites are able to handle larger (rail) casks, distances to suitable railheads, and historic precedent in actual shipments of fuel, waste or other large reactor-related components. DOE also considered relevant information published by knowledgeable sources such as the Nuclear Energy Institute and the State of Nevada. The analysis has confirmed DOE's belief that the mostly legal-weight truck and mostly rail scenarios provide the range (lower and upper bound) of environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste.

8.1 (11533)
Comment - EIS002248 / 0003
If there is some kind of a breakdown in Needles on the railroad, there is no way to transport the shipment, except by highway, out of there. There's no other alternative. So you are going to have to use the roads as an alternative, at least, and it needs to be appraised in the environmental document.

Response
In the event of a breakdown on the railroad at Needles or any other location in the United States, the railroads would initiate their routine recovery procedures. The contractor making the shipment for DOE would have the responsibility to plan for and respond to disruptions, whether incident-free or involving incidents. DOE has defined a set of operational procedures that would be followed by the contractor. These procedures are discussed in more detail in Appendix M of the EIS.

8.1 (11573)
Comment - EIS002281 / 0003
I have heard that the government proposes that the waste be transported in unmarked vehicles, so that saboteurs couldn't know what is being transported.

Well, if the saboteurs don't know, how can emergency people know what's being transported? If this is true, boy, our tax dollars at work, folks.

Response
The shipments would have proper labels and vehicle placards (hazard identification) as required by U.S. Department of Transportation regulations (49 CFR Part 172. Further, DOE would use a satellite-based transportation tracking and communications system such as TRANSCOM to track all shipments. Using this system, DOE would monitor shipments to the repository and, consistent with requirements in Nuclear Regulatory Commission regulations, would provide state and tribal governments with information regarding shipments. In heavily populated areas, armed escorts would be required for highway and rail shipments. For additional details on notification, communication, tracking, security, and emergency response, see Sections M.3 and M.5 of the EIS.

8.1 (11621)
Comment - EIS002239 / 0001
Now, it's true that there are some specific routes that might be used for actual deliveries to Yucca Mountain, where the State of Nevada and the State of California have differences of opinion.

For example, we would like to use 127, 373, from Baker through Death Valley Junction. We think that's the least-risk route if there are going to be large numbers of truck shipments.

California, of course, sees it differently. Other routes that have been talked about are State Route 160 in order to avoid shipments through downtown Las Vegas. So I don't mean to say that there aren't still some controversies to be resolved over routing, but on the big routes, the routes that are going to be the cross Country feeders from the east to the west, we have known all along that the choices are I-70, I-80, and I-40, as DOE does. It's a rail shipment. They are the Union Pacific lines through Nebraska and Wyoming, or the Burlington Northern Santa Fe lines that come into California from Arizona.

Response
Sections 2.1.3.2.1 and 2.1.3.2.2 describe the national and Nevada shipping scenarios, respectively, analyzed by DOE for the actions proposed in the EIS. DOE would select highway modes and routes in consultation with responsible agencies and jurisdictions, and stakeholders and in accordance with U.S. Department of Transportation regulations in 10 CFR 397.101. In the absence of state and tribal designated alternate routes, these regulations require the use of Interstate System highways. The states and tribes can designate alternate routes in accordance with 10 CFR 397.103 that includes a provision for continuity of routes. Section 103(a) states in part:

"Designations must be preceded by substantive consultation with affected local jurisdictions and with any other affected States to ensure consideration of all impacts and continuity of designated routes."

Therefore, any differences of opinion between Nevada and California will have to be resolved by consultation if either or both States designate alternate routes.

8.1 (11677)
Comment - EIS000295 / 0002
Our good friends at the Nevada Agency for Nuclear Projects completed a study in 1995, which could have been used by the DOE in this analysis, which reveals that there are 821 waste shipments via rail through North Carolina, 917 shipments via rail through South Carolina, 3,866 waste shipments via rail and highway through Tennessee and 2,650 shipments via rail and highway through Georgia. Why did the DOE not use that to do a realistic analysis of these shipments?

Response
Section J.1.2 of the EIS provides maps and tables that indicate the number and routing of shipments from 77 sites in the United States to Yucca Mountain. Many tables in this section indicate the origin, miles to be shipped, and number of shipments originating in each state. The tables in Section J.1.3 include the potential impacts associated with a national campaign to transport high-level radioactive waste and spent nuclear fuel to the proposed repository at Yucca Mountain (also see Section 6.2.3).

DOE believes that the mostly rail case, in which more than 95 percent of spent nuclear fuel and high-level radioactive waste would be shipped by rail, would most closely approximate the actual mix of truck and rail shipments. To reach this conclusion, DOE considered whether sites are able to handle larger (rail) casks, distances to suitable railheads, and historic precedent in actual shipments of fuel, waste, or other large reactor-related components. DOE also considered relevant information published by knowledgeable sources such as the Nuclear Energy Institute and the State of Nevada. The analysis has confirmed DOE's belief that the mostly legal-weight truck and mostly rail scenarios provide the range (lower and upper bound) of environmental impacts from the transportation of spent nuclear fuel and high-level radioactive waste.

8.1 (11801)
Comment - EIS000792 / 0001
I recently concluded the highly successful Napalm Recovery Outreach Effort, this after a shaky start similar to what is occurring with your project. As a Captain in the Naval Reserve, I spent 15 months managing the community relations outreach efforts as the Navy fought off opposition of the movement of napalm from our Fallbrook storage facility to Texas and then on to Louisiana. The napalm is moving east on a regular schedule now, with over one-third of the controversial product safely moved with no visible opposition along the way.

Your project is going down the same road that the initial effort of the [Department] of the Navy moved along in early 1998. Before it is too late, you should be talking to those that have had the experience, moving trains through the same area that you are now receiving complaints from.

I am now retired from the Navy and am in a position to offer your effort the many years of community relations experience I have, not only in the Navy on a variety of matters, but as a 44 year active resident (business and elected official) of the high desert portion of San Bernardino County.

Obviously I am watching your efforts daily in the headlines of our regional newspapers. Give me a call.

Response
DOE has spent considerable time and effort reaching out to Federal, state, tribal, and local agencies, and has provided information to the public in a variety of forums. Appendix C of the EIS delineates the interagency and intergovernmental interactions in which the Department has been involved for the Proposed Action. As the Yucca Mountain program moves forward, DOE will intensify these interactions and public outreach forums. Thank you for your offer of assistance.

8.1 (11811)
Comment - EIS001765 / 0001
I don't know if this material can be stored on site or not. If it can, I too would like to see that. But at this stage with the amount of money already spent, maybe it's better if we do move it. Now, how do you move it? It's got to go by

rail or highway, so it has to move through cities like ours. I'm sure safety is the number one priority of all involved in the moving. Somewhere along the line you have to trust others, and I'm sure that if moved, all will be concerned and careful.

Response
As stated in Section 2.1.3.2 of the EIS, the transportation of spent nuclear fuel and high-level radioactive waste would comply with all applicable regulations of the U.S. Department of Transportation and the Nuclear Regulatory Commission. These requirements have been expressed in the protocols established for the Regional Servicing Contractors as outlined in Section M.3. DOE's goal is to provide safe transport and ultimate disposition of these wastes in a geologic repository, regardless of its location. As discussed in Section 2.2, while implementation of the No-Action Alternative (continued onsite storage) would not involve transportation, it would pose other risks. For example, the risks associated with sabotage and materials diversion in relation to the fissionable material stored at the 77 sites would be much greater than they would be if the fissionable materials were stored in a monitored deep geologic repository. Implementation of the No-Action Alternative (Scenario 1) would cost nearly $600 million per year for 9,900 years. DOE agrees, however, that the ability to safely transport high-level radioactive waste and spent nuclear fuel to the proposed repository is an integral part of the determination on whether to recommend Yucca Mountain as a site for a repository.

8.1 (11820)
Comment - EIS002031 / 0006
When moving nuclear waste material from the eastern coast what will the safety precautions be? How do we even know nuclear waste transportation is safe?

Response
Transportation by legal-weight truck would involve shipments along Interstate System highways in accordance with U.S. Department of Transportation regulations (49 CFR Part 397). These regulations limit shipments of hazardous materials such as nuclear waste to Interstate System highways and require shippers to use beltways and bypasses where available. There would be an estimated 3 latent cancer fatalities in the general public from incident-free legal-weight truck transport over the 24-year campaign and 1 latent cancer fatality from rail transport over the same period. DOE also recognizes the potential for transportation accidents and analyzed impacts resulting from transportation accidents in the EIS (see Section 6.6.2.4.2). Although, traffic accidents would be probable given the number of shipments, DOE does not believe that any accident would result in the release of radioactive material, primarily because of the structural integrity of the casks in which the material would be transported (see Section M.4). In the more than 2,700 shipments involving spent nuclear fuel over the past 3 decades, there have been four accidents, with no release of radioactive materials to the environment.

The EIS includes a discussion of TRANSCOM, the satellite-based transportation tracking and communications system that DOE developed to track truck and rail shipments of radioactive materials (see Section 2.1.3.2). In addition, the EIS describes the procedures that would be used by the Regional Servicing Contractors for both legal-weight truck and rail shipments in Section M.3. Additional information on transportation physical protection is provided in Section M.7.

As required by Section 180(c) of the NWPA, DOE would provide technical assistance and funds to states for training for public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions it would transport spent nuclear fuel and high-level radioactive waste. Training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. DOE would institute this training before beginning shipments to the repository. In the event of an incident involving high-level radioactive waste or spent nuclear fuel, the transportation vehicle crew would notify local authorities and the central communications station monitoring the shipment. DOE would make resources available to local authorities as appropriate to mitigate such an incident. Additional information on the elements and implementation of Section 180(c) is provided in Section M.6 of the EIS.